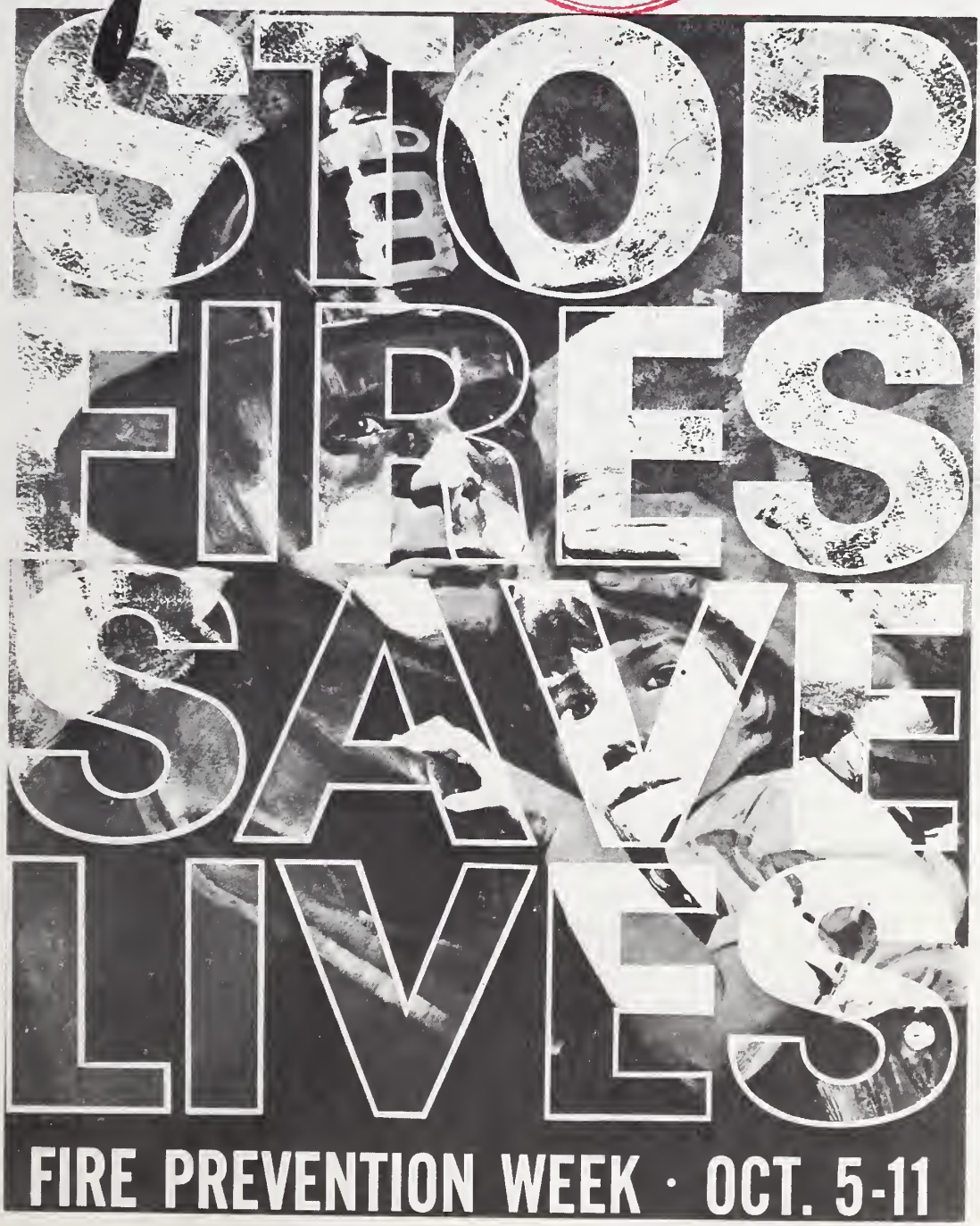
AMC

Safety Digest

SEPTEMBER

AMCP 385-91



★★★★

GENERAL WESTMORELAND PRESENTS FY 1968 DA AWARD OF HONOR FOR SAFETY TO GENERAL CHESAREK

General Westmoreland, Army Chief of Staff, is shown presenting the FY 1968 DA Award of Honor for Safety to General Chesarek.

AMC was presented this top Army safety award for the best command safety program in world-wide competition with all other major commands. This is the fourth time in six years that AMC has been so honored. This command was also presented the FY 1965 DA Award of Merit for second best major command safety program.

The FY 1968 AMC accident experience improved 27% when compared to FY 1967 despite a continued high rate of personnel exposure. For DA safety award purposes, each command's experience is measured against its prior year's experience. Significant statistical factors are accidents, injuries and costs per capita. Other safety program elements evaluated by DA are Command and Staff leadership, program direction, promotion and education, accident reporting and records, and preventive effort.

HEADQUARTERS
UNITED STATES ARMY MATERIEL COMMAND
WASHINGTON, D.C. 20315

AMC Pamphlet 385-91 SEPTEMBER 1969

The Safety Digest is an AMC Pamphlet prepared by the Safety Office Headquarters, U. S. Army Materiel Command. Its purpose is to disseminate information which can materially influence and improve safety programs at all Command establishments.

Articles are included to supplement technical knowledge as well as practical knowledge gained through experience. They provide a basis for the further refinement of safety measures already incorporated in operating procedures and process layout. To achieve maximum effectiveness, the Safety Digest should be given widespread circulation at each AMC establishment.

Articles appearing in the Safety Digest are unclassified and are not copyrighted. They may be reproduced as desired in order to bring pertinent accident prevention information to the attention of all employees. The Army Materiel Command Safety Digest should be given a credit line when articles are extracted.

Unclassified material believed to be of interest or benefit to other establishments is welcome for publication in the Safety Digest. Please send articles for review to: U. S. Army Materiel Command Field Safety Agency, Charlestown, Indiana. If possible, include pictures, charts, drawings, and illustrations that clarify and heighten interest in your presentation.

(AMCSF)

*FOR THE COMMANDER:

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Special Distribution

IN THIS ISSUE

SIMPLE ACTS CAN PREVENT FIRES

Success in fire prevention may be the prize won by "thinking small" as well as by "thinking big". Each individual has daily contact with such fire hazards as waste paper, tobacco products, kitchen heat sources, pressure spray cans and matches. The action he takes or fails to take may prevent or cause an unwanted fire.

Here are examples of fires that occurred at Army Materiel Command installations in FY 1969 when individuals neglected little fire prevention actions:

1. In July 1968 a worker was draining water from the bottom of a 10,000 gallon tank. He left for a drink of water and fuel drained through the open valve. This flowed down a creek, became ignited, and caused about $133,000 non-Army damage.

2. In July 1968 fire broke out in the storage area of an Army quarters that housed twelve families. All occupants were evacuated safely. Damage exceeded $19,000. Investigation revealed that at least one storage bin had contained such flammable materials as gasoline, paint and thinner.

3. In September 1968 an Army wife turned up the heat on a cook stove and went outside. A few minutes later combustible material in a pan on the stove set fire to the kitchen. (In January 1969 cooking oil caught on fire when left unattended on a hot stove element at another installation.)

4. In October 1968 a house guest in Army quarters awoke and found her bed ablaze. The flames were extinguished before extensive damage was done. The fire was believed to have started from a cigarette.

5. In November 1968 an Army dependent struck a match while searching for material in a clothes closet. Some time later the contents were found to be burning. Damage exceeded $500.

6. In January 1969 a fire occurred in quarters when a dependent's seven year old son played with matches. In March and April fires broke out at two other installations after children struck matches.

7. In January 1969 a soldier used burning paper to destroy a hornet's nest. Dry grass caught fire and three tents burned.

8. In February 1969 a truck loaded with paper was backed up to a burning cage. The rear wheels stuck in deep mud. The hot exhaust system ignited paper on the ground, and fire caused $920 damage to the truck. In March a truck at another installation was stopped near a burning pit. It rolled backward into the pit, caught fire and received $448 damage.

9. In January 1969 a forklift mast struck and broke an overhead light bulb. Hot fragments or sparks fell into a tote box of exposed illuminants and ignited them. The fire spread quickly and caused over $896,000 estimated damage.

10. In June 1969 an Army employee became aware of fumes inside the structure where a test was being performed. Work on the test continued. The fumes, caused by leaking gasoline, were ignited by a spark and the man received fatal burns.

All of these examples have things in common. The fire hazards were simple and clear and very little effort would have sufficed to prevent the fires. The persons involved failed to perform easy fire prevention actions. The cost of their failure in these few accidents included a life and over $1,000,000 in destroyed property.

Some fires, such as those that result from chemical reactions during manufacturing processes, may pose special prevention problems. A very large number of fires, however, spring from easily recognized causes. These are the ones that can be prevented by working at the common, everyday fire prevention activities. The measures listed below, vigorously and widely applied, can yield immense dividends in fires prevented, property protected and perhaps lives saved.

1. Publicize the need and the measures for

fire prevention. An admirable job in this area is often done during the annual fire prevention week. Fair efforts are sometimes expended during the Christmas and spring housekeeping periods. These fitful exertions are not enough, because fires occur every day of the year. The subject should be brought to every person's attention frequently throughout the year.

2. Training of a cradle-to-the-grave scope is necessary. Small children need it, because they are fascinated by fire itself and fire producing devices such as matches and cigarette lighters. Adults need it, because some of them forgetfully leave cooking oils unattended on stoves, smoke in bed, or take other heedless risks.

3. Good housekeeping prevents fires as well as falls and other accidents. Good housekeeping means general cleanliness and neatness, rather than restricted and specific activities such as control of oily rags.

4. Effective control measures should be practiced whenever flammable materials are involved. Those oily rags, petroleum products, paint and thinners may contribute to the start of flames and will surely help sustain and spread fires ignited by other sources.

5. Fire prevention rules should be established and enforced. These should fit circumstances, and should range upward from "No match striking by unattended children." To be effective the rules should be as simple and clear as possible and be clearly understood. The reason for each rule should also be understood.

6. Inspections should be made regularly. The aim should be to detect and eliminate or control fire sources that other individuals have failed to see. Fire is far too important a subject for an "Aha! I've found a gig type deficiency!"

7. Fire prevention should be wholeheartedly accepted as a matter of personal and parental responsibility. The individual should realize that his failure, or that of others about him, can cost such things as property, home, job or lives. His ability to use and benefit from fire is accompanied by a never-ending responsibility to make certain it is controlled.

8. Habit should be harnessed as a fire prevention aid. Much of our time is spent in doing things by habit, rather than by thought. The old Army custom of field stripping cigarette butts is a fire prevention habit. There are others you practice daily and there may be even more you may be able to identify and adopt.

All fires start as little fires. Your little acts can prevent these little fires from starting and becoming larger fires.

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BEWARE OF FAIR WEATHER DRIVING

You will soon be exposed to warnings about the hazards of fall and winter driving in darkness and on wet and slippery roads. For the sake of your continued safety it will be well to heed the cautions urged upon you.

You still have time to profit from an admonition about driving under two other conditions that pose even greater threats to safe driving. These are clear weather and dry roadways, the conditions that prevail when a vast majority of traffic accidents occur.

The Travelers 1969 Book of Street and Highway Accident Data reports that 76.5 per cent of the 1968 traffic fatalities occurred when dry road conditions prevailed. Roads were wet when 19.0 per cent of the fatalities happened. Snowy and icy weather existed where 4.5 per cent of the deaths occurred.

Clear weather prevailed for 83.7 per cent of the reported fatalities. It was rainy when 11.6 per cent of the traffic deaths were experienced, snowy 2.5 per cent and foggy 2.2 per cent.

Obviously driving is more difficult under adverse weather conditions, but the drivers try harder to operate safely. Many of them adjust their driving to prevailing conditions.

The data summarized above suggests the time is ripe for better driver adjustment to favorable weather and road conditions. When conditions are ideal, they should try harder to be safe.

HUNTING ACCIDENT PEAK APPROACHES

As the weather grows cooler the hunting season heads toward its annual peak of activity. Whether game proves to be plentiful or scarce, some of the sportsmen will certainly be bagged by their fellow hunters or will injure themselves through their own ineptitude as gun handlers.

A recent study of hunting accidents experienced by Army personnel reveals facts that should help keep your personnel uninjured. The information was obtained from accident statistical punched cards received by Headquarters, U.S. Continental Army Command. These provided data for over 300 hunting accidents that occurred in a five and one-half year period between January 1963 and June 1968. The accidents resulted in 12 deaths, 286 disabling injuries, four extensive fires and nearly $2,000,000 of direct federal costs.

Because of their training and familiarity with small arms, Army personnel should represent the safest type of hunters. Hunting may be expected to be even more hazardous for the less well trained "average" hunter. Both Active Army and civilian sportsmen should be able to learn from the accident experience of Army personnel.

The following highlights were revealed by the study:

1. Sixty per cent of the accidents occurred in the four month period of October through January. December was the peak month.

2. One-third of all the hunting accidents involved defective or inadequately maintained firearms.

3. In over 40 per cent of the accidents, the safety lock on the weapon was not used. There was no safety lock available in 12 per cent of the cases.

4. Hunting in a hazardous manner was listed on 13 per cent of the reports; carrying loaded firearms in an unsafe manner in 12 per cent; and running

and jumping in six per cent.

5. Fifteen cases involved bad hunting habits such as pulling loaded guns through fences, leaning loaded guns against objects, and letting guns remain loaded.

6. Nine cases involved cleaning weapons that were loaded.

7. In nine cases hunters fired before positively identifying the target, killing six persons and seriously wounding three.

8. The following were the leading unsafe personal factors:

- Disregarding instructions -30.5%
- Unable to recognize or appreciate hazard -23.8%
- Inattention, unobservant -13.8%
- Inadequate knowledge or skill -12.4%
- Unaware of safe practice -10.1%

9. Intoxication was cited as a factor in only two cases in FY 1968.

10. Gunshot wounds, including 11 deaths, accounted for 70 per cent of the total injuries, with an average loss of over 30 days per injury.

11. Amputations and avulsions (including gunshot wounds) accounted for 17 per cent of the injuries, with an average loss of 40 days for each accident.

12. Four per cent of the injuries were fatal. Injuries in other sports are much less likely to cause death.

The study recommended that the following measures be implemented to prevent accidents in areas where supervised hunting is conducted:

1. Hunting areas and stands should be adequately maintained. If practical, guide signs should be posted.

2. Central check points should be established, to assign hunting sites, check hunting licenses, review

installation hunting safety rules, provide map orientation, and serve as check stations for game.

3. Emphasis should be given to correct procedures for loading and unloading, use of safety locks, keeping finger off trigger until ready to fire, and crossing fences while carrying weapons.

4. All firearms and ammunition should be inspected for safety before hunting.

5. Emergency search and medical evacuation plans should be current.

6. Hunting or sportsmen's clubs should be established and encouraged to participate in post conservation, to distribute hunting safety material, to show hunting and firearms safety films, to sponsor hunting safety programs, to schedule pre-hunting season tours, to encourage use of the "Buddy System" to safeguard hunters, and to require use of blaze orange (fluorescent) attire.

Most hunting and hunting accidents occur when the sport is unsupervised. The following recommendations should help prevent accidents under these conditions:

1. Provisions should be made for safety inspection of weapons before the hunter takes to the field.

2. Hunting and firearms safety should be publicized in advance of the hunting season, by films and safety promotional materials.

3. Emphasis should be given to such safety practices as the following:

a. Using safe weapons only.

b. Using the proper ammunition for the weapon.

c. Correct procedures for loading and unloading firearms.

d. Use of safety locks.

e. Keeping finger off the trigger until ready to fire.

f. Safe movement of the weapon across fences.

g. Use of fluorescent blaze orange clothing.

h. Clearing the weapon before cleaning it.

i. Wearing sufficient clothing for the lowest temperature anticipated.

j. Identification of the object before aiming gun at it.

4. Participation in hunting and sportsmen clubs should be encouraged.

Every sportsman should be imbued with the understanding that any improper use of his weapon may endanger himself and the property and lives of others. He alone has the ultimate responsibility for using his weapon in a safe manner.

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AMC - THE ARMY'S GIANT LOGISTICS COMMAND

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The Army Materiel Command today consists of a nationwide network of more than 80 military installations and more than 100 activities in the continental United States and throughout the world.

The Command directly employs approximately 178,600 personnel, of whom 15,600 are military officers and enlisted personnel and 163,000 are civilian employees.

50-50 Arrangement

AMC is responsible for a materiel inventory of approximately $21-billion, of which 50% is in depots or in transit and 50% is in the hands of the troops. The Command's annual expenditures average more than $15-billion.

Each fiscal year since FY '66, for instance, AMC's budget and expenditures have averaged approximately $15-billion for a total through FY '69 of about $60-billion for the four year period. The Command's largest budget programs scheduled for FY'69 are: $9.4-billion for PEMA (Procurement of Equipment and Missiles, Army); $2-billion, Stock Fund: $1.6-billion, OMA (Operation and Maintenance, Army); and $1.1-billion, RDT&E (Research, Development, Test, and Evaluation).

AMC Headquarters in Washington, D.C., provides policy direction for the command's far-flung operations. Nine major subordinate commands, located throughout the eastern half of the United States, serve as the "mid-management" level. They include seven commodity-type commands that are responsible for integrated commodity management of assigned categories of weapons, equipment, and supplies; one test and evaluation command, and one logistics support-type command.

Individual installations and activities, some reporting directly to AMC Headquarters and others to major subordinate commands, accomplish actual execution of the Army's materiel program. These range from depots, laboratories, arsenals, schools, maintenance shops, test ranges, proving grounds, and procurement offices in the United States to customer assistance offices and logistics management offices throughout Europe and the Far East.

The Command also makes maximum use of "vertical management" techniques, using project product managers to expedite development, production and delivery of more than 60 selected major or critical weapons or equipment systems.

Army Materiel Command Headquarters itself operates with a staff of approximately 2,300 personnel, including 360 military and 1,940 civilians.

In addition to the Deputy Commanding General, the Headquarters includes Deputy Commanding Generals for Materiel Acquisition and Logistics Support and a Deputy for Laboratories. Directorates include those for Management Information Systems, Quality Assurance, Installations and Services, Personnel and Training, and the Comptroller.

Special staff elements include those normal for any Major Command Headquarters such as the Administrative Office, Historical Office, General Counsel, Chaplain, Judge Advocate, Inspector General, Information Office, Safety Office, Security Office and Surgeon. Additionally, there are special assistants to advise the Commanding General such specialized areas as Engineering, Congressional Affairs, Nuclear, Chemical and Biological Affairs, Project Management, and Technical Relations Advisor.

Also located at the Headquarters are liaison officers representing various other U.S. military elements and those of Great Britain, Canada and the Federal Republic of Germany.

AMC's nine major subordinate commands are responsible for making the complex operation work: Each is important to the overall program. The first seven are commodity-type commands; the other two include a test and evaluation command and a logistics support-type command.

The receipt, storage, issue and maintenance support for AMC's thousands of weapon, equipment, and supply items is accomplished by a coast-to-coast system of 19 depots. The system fills and average of 500,000 individual requisitions a month from users of AMC materiel throughout the world.

Also, the command has 17 research and development laboratories/centers that continually strive toward a common goal of improvement of the state-of-the-art in their specific fields in support of the Army's field materiel requirements.

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NSC URGES YOU TO TREAT YOUR VACUUM BOTTLE WITH TENDER, LOVING CARE.

The National Safety Council urges you to treat your vacuum bottle with tender, loving care.

Innocent as they may look, says the Council, vacuum bottles are potential bombs looking for a time and a place to explode and a moment of carelessness on your part could lead to a lifetime of blindness.

One of the Council's monthly safety newsletters recently carried a story about a worker in Hamilton, Ontario who was spooning soup from a quart-size vacuum bottle when the bottle exploded in his face.

It seems the metal spoon cracked the glass lining causing it to implode,then explode, sending glass fragments out of the thermos opening into the worker's face.

One of the worker's eyes had to be "frozen" to remove numerous glass splinters. He also suffered cuts to his face.

The damage to his eye fortunately did not affect his vision.

The Council says the following safety guidelines for the home as well as on the job can be concluded:

- Never insert metal utensils or other objects inside vacuum/thermos bottles.
- Avoid sudden temperature extremes, such as pouring boiling hot coffee into a thermos containing ice cubes.
- Handle with care as you would any other glass object.

SAFETY IS THE PILOT'S RESPONSIBILITY

Department of the Army Regulation 95-5 states emphatically and repeatedly that accident prevention is the commander's responsibility. Since all pilots belong to some commander and since those who lead are responsible for those who follow, then certainly the commander is responsible for aviation safety. But, there is another angle to this multicolored prism of responsibility. It certainly seems that those who can most easily prevent accidents should be the most responsible for aviation safety and that's the pilot. Let's discuss this responsibility.

The Army Aviation Accident Prevention Program seeks to prevent accidents by investigating and revealing cause factors, by reeducating and retraining pilots with improved procedures, by analyzing and modifying material failures and by instituting supervisory guidelines for commanders. So, where does the aviator fit into this program? Discussing two basic pilot attitudes will give a clue.

"The law of averages insists on accidents commensurate with exposure." We have all heard this and probably most of us see some validity in it. Look a little deeper. USABAAR has reviewed all Army aircraft accidents and has compiled the following statistics. Of all Army aircraft accidents, over 90 percent involve pilot-related cause factors, either directly by poor judgment or lack of proficiency, or indirectly as a result of not following the prescribed procedure when some mechanical failure occurred. If every pilot had flawless proficiency, demonstrated sound judgment, and exhibited thorough knowledge, there would be very few accidents. Have you heard of Zero Defects? But, you say, that's asking for perfection. Can you think of a better goal than zero pilot errors in aviation?

So, can all aircraft accidents be prevented? Well, every accident investigation reveals some cause factor that could have been prevented, and having been prevented, no accident would have occurred. Take any <u>one</u> accident, find out what caused it, prevent that cause, and you have prevented that accident. Therefore, if one accident can be prevented, all accidents can be prevented. That in a nutshell is the philosophy behind the Army Aviation Accident Prevention Program. But, you can certainly appreciate the magnitude and

near impossibility of its task. The pilot factor is the weakest link in this chain and before any real hope of prevention success is possible one other insidious attitude must be disected and laid bare.

"It can't happen to me." It is simply human nature to believe catastrophies only occur to others. Exactly what psychological factor in the human make-up causes this illusion is not relative here. It does exist and is relative to Army aircraft accidents. Pilots, probably more so than other people, are devout believers and practitioners of this belief. Someone has said that all pilots are, to one degree or another, egotists in that they have overcome some natural limitations restrictive to other people. The blend of some shade of egoism and the natural belief that "It can't happen to me" can and do lead pilots to commit acts of judgment so ill-advised that they are led into situations beyond their skill to overcome. Sometimes it leads to a scared, but educated pilot. If every pilot who believed "It can't happen to me" never had it happen to him, there would be no accidents.

All accidents can be prevented. Our aircraft and missions are becoming more complicated and sophisticated. We must strive to achieve and accomplish proficiency. We must attain a depth of knowledge of our aircraft and our capability. And we must retain the hard lessons of experience, both our own and those of others. Judgment, knowledge, and skill are the pilot's allies. They can only be attained by hard work and constant self-improvement. Our worst enemies are overconfidence that rusts proficiency and complacency that dulls the alert mind.

Safety and professionalism are two sides of the same coin, pilot responsibility. And that's why all pilots must be Aviation Safety Officers if our prevention program is to succeed.

OPERATION SHARE

In letters from the Chief of Staff of the Army, the winners of the FY 68 DA Awards were notified of their selection. Winners are:

Award of Honor for Safety

U.S. Army Materiel Command
Fifth U.S. Army
9th Infantry Division
3d Infantry Division

Award of Merit for Safety

U.S. Army Security Agency
First U.S. Army
Sixth U.S. Army
101st Airborne Division (Airmobile)
24th Infantry Division

An announcement was also carried in General Order 37, 12 June 1969.

Dates for the TAG School course in "Army Safety Program Management" for fiscal 1970 are:

Class #1	7 September - 3 October 1969
Class #2	26 October - 21 November 1969
Class #3	1 March - 27 March 1970
Class #4	26 April - 22 May 1970

To improve the homogeneity of the classes, candidates are being restricted to civilian grades GS-7 to GS-12, and military grades to captain and above. Exceptions can always be made for higher grade civilians when necessary.

Again this year official recognition is being given the tragedy of blindness. President Nixon has proclaimed October 15, 1969 as White Cane Safety Day. Although this falls very close to Fire Prevention Week and its activities, consideration might be given to some form of local recognition in support of the President's proclamation.

IF YOUR LIFE IS AT STAKE, KNOW YOUR VENDOR

R. E. Johnson, Safety Services Superintendent
Olin Mathieson Chemical Corporation
Badger Army Ammunition Plant

Recently a fireman collapsed while he was receiving training with a self-contained breathing apparatus that used a compressed air supply. The drill supervisor quickly removed the mask, and the man soon recovered. His life would probably have been lost if prompt help had not been immediately at hand.

When the safety of the fireman had been assured the questions of how and why the incident could occur were investigated. Was the mask operating properly? The answer was, "Yes". Was the bottle full? Again the answer was, "Yes, by the pressure gauge." Was the supposed breathing air in the bottle pure and adequate? It had been recently purged and refilled by a large compressed air vendor.

A test on samples from the lot of bottles in question disclosed two contained 97 per cent nitrogen and 3 per cent oxygen. The fireman obviously had collapsed from asphyxiation. What had happened was known, but why and how to prevent repetition remained unanswered.

A check with the vendor revealed he supplied breathing air by mixing nitrogen and oxygen. He had good but obviously not foolproof quality control. Apparently both his mixing procedure and his quality control had failed.

We knew what had happened to our fireman and why it happened. The problem of preventing repetition

remained. The Plant could easily check any breathing air bottles refilled for oxygen content, but checks against pollution by any of the other industrial gases supplied by the vendor would be costly and unreasonable. Purchase of a compressor was considered, but the low consumption of breathing gas made such an expenditure unrealistic if an inexpensive supply of pure air could be found.

Ultimately it was decided to purchase breathing air bottle refill service from a local source. The vendor had built up a business servicing area fire departments and scuba divers. The only compressed gas he handled was air. He had a good reputation and his equipment was inspected and found to be adequate.

A life was nearly lost by relying on a vendor whose problems we did not appreciate. Fortunately, the incident occurred during a drill when help was at hand. We have confidence that our knowledge of, and personal contact with the new source of supply will eliminate a frightening danger discovered by accident.

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NSC REPORTS NEARLY ONE-FOURTH OF ALL SERIOUS OCCUPATIONAL INJURIES RESULT FROM THE MANUAL HANDLING OF MATERIALS

Records compiled by the National Safety Council show that nearly one-fourth of all serious occupational injuries result from the manual handling of materials.

The Council--which has been involved with the prevention of industrial accidents for more than 50 years--lists the following unsafe work practices that have lead to manual handling injuries:

. Placing fingers or hands at pinch points while moving objects.
. Gripping objects improperly, allowing them to fall or slip.
. Carrying too heavy a load.
. Failing to wear safety shoes.
. Lifting in an awkward position, or lifting with the back instead of using the leg muscles.

A CONTRACTOR TRAINS HIS SAFETY INSPECTORS

Tommy R. Stewart
Safety Department, Sperry Rand Corporation
Louisiana Army Ammunition Plant

One major factor which contributes to a successful safety program is the availability and utilization of a technically qualified and experienced work force of safety inspectors. Experience at the Louisiana Army Ammunition Plant industrial complex has revealed that individuals with experience in munitions safety are not available on the local labor market. As a result, individuals who are inexperienced safety wise, but who display an adaptability and potential for the safety field, are employed to fill safety inspector vacancies. These persons must be thoroughly trained in order for them to properly perform their inspection duties.*

A review of the effectiveness of the local training program for safety inspectors was made in the fall of 1968. Results indicated that a fresh look should be taken at this program, with particular emphasis being placed on insuring that it was more effective, technically sound and encompassed all segments of the safety inspector's duties and responsibilities.

With these objectives in mind, two new training

*Editor's Note: The shortage of qualified and experienced safety personnel is not limited to contractor-operated munitions plants. The Army Materiel Command has filled a part of its requirements through its Safety Career Management Intern Training Program, now in its fifth year. Young college graduates are recruited, trained intensively at the AMC Field Safety Agency and typical installations, and assigned to safety offices at AMC installations. These young and vigorous safety officers and safety engineers show promise of becoming leaders in the profession.

courses were developed. One was for newly hired safety inspectors and the other was a refresher training course for the more experienced safety inspectors.

The training course for new safety inspectors consists of two phases and requires five weeks, or a total of 200 hours, for completion. The first phase includes a five-hour introductory safety course, reading assignments on certain chapters of AMCR 385-224, the AMC Safety Manual, and a self-study course of instruction entitled, "Fundamentals of Accident Prevention for Supervisors". The self-study course contains 12 chapters and 35 lessons with appropriate open-book examinations. During this phase, formal on-the-job training is also conducted by a fully qualified senior safety inspector. He stresses inspection techniques, methods to use in accomplishing special inspections and report writing.

The second phase consists of nine hours of formal classroom training covering a variety of subjects essential to knowledge of Munitions Safety, such as characteristics of munitions, storage and compatibility, quantity-distance, and safety in melt-pour, screening and blending operations. Also included are assignments for reading munition portions of AMCR 385-224, nine open-book examinations on munitions safety manual problems and 11 open-book examinations on industrial safety manual problems. A closed-book final written examination completes this course of instruction.

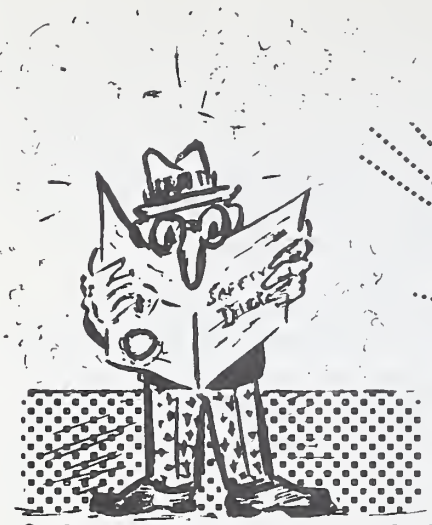
The Refresher Course for Safety Inspectors is also formulated in two phases. The first phase

includes nine hours of formal classroom training on technical munitions safety subjects. Included in this phase are nine open-book examinations on munitions safety manual problems. The second phase includes the self-study course of instruction entitled, "Fundamentals of Accident Prevention for Supervisors", and 11 open-book examinations on industrial safety manual problems. A written final examination completes this training course.

Training records are maintained to indicate the student's attendance, examination scores and other pertinent information. Individuals who satisfactorily complete the course of instruction receive certificates of training, presented with appropriate ceremonies.

At the time this was written, 36 members of the Safety Department were enrolled in the Refresher Training Course for Safety Inspectors and one newly hired inspector had completed the 200-hour course of instruction.

Since the initiation of the Refresher Training Course, a marked improvement in all phases of safety inspections has been noted. Moreover, individuals have noticeably increased their knowledge of AMCR 385-224 and the technical aspects of munitions and industrial safety. In view of these sound advancements, it is apparent that our safety training program has had a positive and beneficial impact on plant safety inspections and the overall safety program.



Current Events

CONVEYOR RUBS FOOT ROUGHLY

Boxes of cyclotol were moved by conveyor from one building to the second floor or another building. After the last box moved out of the first building, the conveyor was turned off.

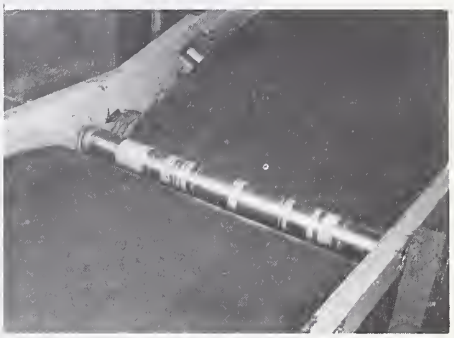
A female explosives operator was waiting for the cyclotol in the second building. When the conveyor stopped before all the boxes were delivered, she walked to the first building and restarted the conveyor. She left it running and walked back toward her work station.

On the way she noticed that one box had been improperly placed. When it moved up the inclined belt, it could jam in a spot where the conveyor narrowed. The box was approaching this spot.

The young woman climbed onto the moving horizontal conveyor near its end. To reach the box she then positioned herself in a prone position on the inclined conveyor. She straightened the crooked box and it moved on through the narrow section.

While she had been doing this, the conveyor had

continued to move beneath her. Now as she attempted to dismount both her feet were caught between the belt roller at the bottom of the incline. (See photo.) The increased load of her feet caused the horizontal conveyor to shut off. The inclined conveyor continued running until help arrived. The woman's feet remained caught until a millwright removed the roller.



The woman's injuries were described as "avulsion - plantar surface left foot". (Part of the sole of the foot was torn or wrenched away.) She was expected to lose 21 days from work.

The following actions were taken to make the work area safer:

1. The idler roller on the conveyor was mounted in slots to permit it to be raised quickly for pinch point relief.

2. An engineering study was made to determine ways to eliminate jamming points on the conveyor.

3. Employees were reinstructed not to climb upon moving conveyors.

4. Appropriate action was planned to discipline the employee who was involved in the accident.

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WOMAN FALLS FROM PEDESTAL

An Army Civilian typist was bothered with back trouble. She asked permission to substitute a straight back office chair for her conventional typist chair. Permission was granted, but the substitute chair created another problem. It was too low to permit her to type comfortably.

It was suggested that a platform might be used to elevate the chair. A 22" X 36" X 4" platform was constructed, and the typist's chair was placed on this. It provided sufficient height for her to reach the typewriter keyboard comfortably and she proceeded with her work.

All went well until one of the chair legs worked its way over the edge of the platform. The chair tilted sharply and the typist was thrown to the floor. A bone in her left foot was broken, and she was away from work for four days.

Prompt action was taken to remove and destroy the platform.

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SEAT BELT WAS NOT USED

An Army employee was riding in an eight-passenger van type motor vehicle. He was sitting on the far right position on the center seat, next to the double doors. The vehicle made a left turn, the double doors opened, and the man fell out. His head struck the pavement and he received a skull fracture. He was expected to be away from work for a month.

Investigation revealed that a door latch was defective. Either vibration or unintentional activation of the handle during the turn permitted the door to open.

The description of the accident closed with the remark: "Seat belts were installed in the vehicle but were not being used."

The vehicle was deadlined for repairs. All similar vehicles at the installation were inspected and were found to be in satisfactory condition.

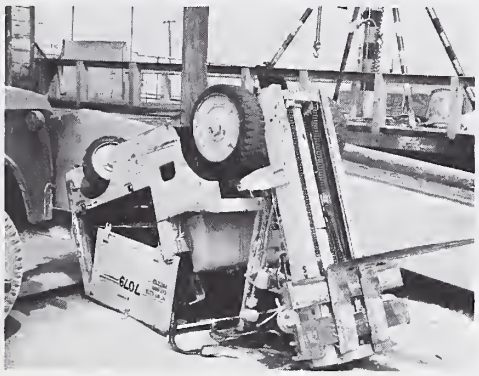
The installation began immediately to place increased emphasis on the use of seat belts.

DRIVERS FAILED TO GET TOGETHER

A forklift was transported on a flat-bed truck to a building where materials handling machines were serviced. The driver backed the truck against the shop's loading dock and remained in the cab until the forklift was unloaded. Assuming that the transfer of material had been completed, the driver dismounted from the cab and left the truck at the dock.

While the driver was away from his truck a repairman drove a forklift out of the shop to load it on the truck. As he started to drive it onto the truck bed, the vehicle began to move forward. The repairman attempted to reverse the forklift to back it on to the loading dock. Time was too short. The forklift and the dock plate fell to the ground behind the moving truck.

1



2

When the forklift began to fall, the repairman made a desperate effort to jump free. He hit the side of the dock and bruised his side and hip. He escaped being pinned beneath the forklift, which landed upside down as shown in Photo 1.

The flatbed truck rolled down a slight grade and struck a parked trailer. Photo 2 shows the condition of the front end when it came to rest.

Property damage in the accident was estimated at $506.

The handbrake on the truck was defective. The driver, unaware that a forklift was to be loaded, was not present to hold the brakes. He had also failed to

block the wheels of his vehicle. Both the truck driver and the forklift operator were given oral reprimands for failing to make certain the truck wheels were blocked. Wheel chocks were attached to the truck in order to be available at all locations. All battery shop employees and truck drivers were reinstructed on the use of wheel chocks when forklift trucks were being loaded and unloaded.

****

HE PUT HIS HEAD IN MACHINE'S MOUTH

A contractor employee was assigned the job of "catching" billets as they emerged from a press. The work went along smoothly until one of the billets became lodged in the chute on the machine. The worker attempted to locate the cause.

His first action was to turn off the electrical power to prevent the press from cycling. He did not turn off the air pressure. He next removed the machine's front guard as he attempted to locate the trouble. He then put his head inside the press to check further.

At this moment a steel side shield fell onto a compressed air line. This ruptured the line and the suddenly released air blew a quantity of steel slag up into the face of the employee. In his panic to escape, the man jerked his head back, striking it sharply against the operating arm of the press.

The worker was taken promptly to a hospital. He was admitted for a contusion of the entire right side of his face. His injuries included a laceration of the upper lip at the right corner of his mouth, a bloody nose, abrasion of the right cheek and a fracture of the right upper jaw. Surgery was required, and he lost ten days from work.

The contractor's supervisors issued instructions that maintenance personnel would be notified of any machine breakdown. A qualified skilled technician would explore the problem and perform necessary machine

adjustments and repairs. Air pressure as well as electrical power would be shut off before the guard was removed before work was started on presses.

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CRANE PERFORMS POORLY AS TOW TRUCK

The loaded dump truck had broken down in a most inconvenient location. It had been backed into a 25' X 100' blind alleyway between two wings of a building. Its rear wheels locked by the air brakes and construction project traffic was blocked.

A mechanic came from the motor pool and inspected the disabled truck. He determined that its trouble was a defective starter motor. It should take several hours to remove the starter motor, repair it and reinstall it. The truck should then be in condition to start and drive away under its own power.

The supervisor of construction activities declared his work had too high a priority to be stopped for hours by one stalled truck. It was blocking the entrance to the work site and preventing the use of other machinery. The dump truck had to be moved.

The mechanic reported the situation to the Motor Pool Operations supervisor. This man decided that a 20-ton mobile crane, already available in the work site area, could be used to move the dump truck. Two licensed crane operators were present to operate the crane.

The two crane operators examined the situation before starting the truck towing operation with their 20-ton crane. They called the attention of the on-site construction supervisor to the load of dirt in the dump truck. They estimated it might weigh five tons, and they recommended it be dumped before they tried to move the vehicle. The supervisor rejected the suggestion, saying a dumped load of dirt would add to the delay in getting on with the job.

Instead of reporting this complication to the Motor Pool Operations supervisor, the crane operators undertook to carry out the wishes of the construction supervisor. One operator backed the crane into place. The second, acting as his helper, seated himself in the cab at the crane controls. The mechanic climbed into place at the steering wheel of the disabled truck.

The locked rear wheels of the truck were to be lifted. The boom, 40 feet in length and raised to a 55° angle, extended back over the top of the truck. The crane hook was then perpendicular to the rear of the truck. A cable attached to the rear of the truck was fastened to the crane hook. The operator in the crane control cab raised the hook and the rear end of the truck was lifted several inches off the ground.

A tow cable was attached to the front bumper hooks of the truck and looped into the hooking arrangement at the rear of the crane carriage. When the cable was tightened there was a four-foot space between the truck bumper and the crane.

The towing operation now began and all went well for 50 feet. Then the front wheels of the truck started up an incline, and a rocking motion began. The front end of the crane was raised and the rear wheel of the boom, and it began to twist and buckle in its middle section. The motion stopped when the middle boom section crashed onto the metal cover of the truck, as shown in Photo.

There were no injuries. Total damage to the crane and truck was estimated at $482.

Motor Pool personnel were instructed to consult with their supervisor for advice and guidance before they attempted to move equipment where unusual conditions or safety of equipment existed.

The accident report was prepared by a Motor Pool supervisor. He made no comment on any share of accident responsibility that might be attributed to the on-site construction supervision. They had reacted unfavorably to the truck unloading suggestion and the method being used to move the heavy stalled vehicle was clearly visible to them.

MOTIVATE YOUR EMPLOYEES TO WORK SAFELY

Robert R. Cavanaugh, Safety Officer
St. Louis Army Ammunition Plant

It has been observed many times that accidents seldom happen in a department that is being run the right way. Its supervisor knows that little accidents are an indication that something is wrong and that corrective action is needed. The same cause that results in the loss of a few minutes, slight damage or a first-aid injury may cause another accident that badly damages an expensive machine or seriously injures or kills an employee.

When little accidents begin to occur, the alert supervisor gives intensified attention to human factors. He encounters the same human problems you see around you any time you take a moment to look. Here are examples of the troublesome personnel factors with which he may have to contend:

1. Recklessness and stubborness of some workers.

2. Uncontrolled personal faults such as temper, nervousness, excitability.

3. Unsafe practices such as horseplay, walking under suspended loads, and removing guards or railings.

It is necessary to know the individual employee well in order to know what will motivate him to work safely and efficiently. Some of the more useful incentives recognized by the successful supervisor are the following:

1. Self preservation (fear of personal injury).

2. Personal gains (desire for promotion).

3. Responsibility (recognition of obligation).

4. Pride (self-satisfaction).

5. Rivalry (desire to compete).

6. Leadership (desire to be outstanding).

7. Humanity (desire to serve others).

These motivations, qualities or characteristics are present to some extent in everybody. Some of them are more pronounced in certain individuals. One of your tasks as a supervisor is to identify them, to control them to the extent that productive rather than destructive use is made of them, and to make certain that they are not misapplied in a way that will cause accidents.

Obviously no one set of rules can be applied to all employees and to all situations. Study, knowledge and forethought are necessary. The good supervisor and the good safety man will think ahead and try to act upon rather than react to the situation he faces. The most effective effort he can make is that which motivates his personnel to want to work safely and efficiently. When they make a determined effort to be safe, their likelihood of success will be greatly increased.

RESPIRATORY PROTECTIVE DEVICES

Question 6 on page 50 and its answer on page 56 of the May 1969 Safety Digest dealt with agencies whose approval was required for respiratory protective devices. The answer was based on information contained in paragraph 1009, AMCR 385-224.

Some of the information in paragraph 1009 is out-of-date. The United States Bureau of Mines is the Federal agency which now approves respiratory protective devices that are to be used by personnel employed in dusty or toxic atmospheres. The devices it approves include those used to provide protection for users of agricultural pesticides.

When a revised edition of AMCR 385-224 is issued, its paragraph 1009 is expected to read as follows:

"1009. RESPIRATORY PROTECTIVE DEVICES

Persons employed in dusty or toxic atmospheres, where adequate ventilation or engineering controls have **not** been provided, shall be provided with and required to wear respiratory protective devices of the type approved for the hazard by the United States Bureau of Mines. Appropriate devices for various types of exposure are listed in Table 2, TB MED 223, Respiratory Protective Devices. Table 3 of this publication lists respirators suitable for use by personnel engaged in pesticide work. The concentration of the toxic atmospheric contaminant shall determine the necessity for such equipment. Positive pressure hose masks, airline respirators, self-contained breathing apparatus, industrial gas masks and the like should be approved for the purpose for which they are utilized by a recognized testing agency. Such equipment shall be maintained in serviceable condition. When an airline respirator is used the following precautions must be taken: (1) A trap and filter will be installed in the compressor line ahead of the mask which will separate oil, water, scale, or other extraneous matter from the air stream; and (2) A pressure regulator is required if the compressor line exceeds 25 p.s.i.; (3) A pressure relief valve will be provided to operate in the event the regulator fails."

SNAPPY BRIDGE PLATE TRIES TO GOBBLE TOES

James W. Whalin, Safety Officer
Atlanta Army Depot

Mr. Robert Marshall, a civilian employee at Atlanta Army Depot, was helping unload material from a trailer with a forklift truck. He was walking alongside the forklift truck helping to hold the load on the forks. The truck went over a bridge plate lip and the plate lifted up on the lower side. Mr. Marshall's foot was caught between the plate and concrete floor of the ramp.

Hard toe safety shoes saved Mr. Marshall's toes. Had he not been wearing safety shoes the accident could have resulted in a very serious injury, perhaps even amputation of some of the toes.

Robert Marshall shows the position of his foot when a bridge plate moved under the weight of a forklift truck. Shown with him in the posed photo are forklift operator John H. Mitchell and Safety Officer W.E. Haynes.

Mr. Marshall's safety shoe saved his foot from serious injuries that might have been inflicted by the heavily loaded bridge plate. The photo above shows how the leather was torn from the shoe's protective steel toe guard.

Re-enactment for a photograph was set up by Mr. W.E. Haynes, Safety Officer, pictured with the victim and an operator, Mr. John H. Mitchell. (Mr. Mitchell was not the operator of the forklift at the time of the accident.)

The practice of walking alongside forklift trucks to stabilize the load is thoroughly discouraged at Atlanta Army Depot. If it occurs and is detected, this obviously unsafe act is promptly called to the attention of the supervisor. Operators should be sure that the loads are stable before an attempt is made to move them. Any load that proves to be unstable should be restacked. Restacking is done with the material off the forks of the truck.

Movement of stable loads on forklift trucks is far less hazardous for the following reasons:

1. Personnel are kept well back to lessen chances of injury due to material falling from the forks.

2. Goods are not damaged so easily.

3. Operators of the forklifts can transport the material quicker.

IT'S YOUR SKIN

P. A. Griffin, Manager, Safety & Security Division
Ravenna Arsenal, Inc.
Ravenna Army Ammunition Plant

The skin provides an important natural barrier against many adversities in the working environment. With over 3,000 square inches of surface area, it is the largest organ of the body. Nerves, a blood supply, excretory glands, hair, and special reproducing cells make up its complex structure.

Many materials and conditions are detrimental to the skin and may eventually cause a breakdown of the protective barrier. This breakdown may result in a condition known as dermatosis.

Dermatoses are responsible for two-thirds of all occupational diseases. It is estimated that at any one time 750,000 workers may be affected with dermatosis in this country. The cost associated with dermatoses exceeds $125,000,000 annually.

There are many types of dermatoses found in industry. Mechanical dermatosis, physical dermatosis and chemical dermatosis are the most common. Abrasions, bruises, and open wounds are forms of mechanical dermatosis. Physical dermatosis may occur as a result of excessive heat, cold or radiation. Chemical dermatosis is the result of contact with solvents, acids, alkalies, oils and dusts. Many times dermatosis may be a combination of these forms.

Dermatosis is very often progressive. It usually begins as a rash or reddened area. The area becomes inflamed and blisters may form. The injured area becomes dry and cracks. Continued contact with the cause factor aggravates the condition. Once the protective barrier is broken the body is subject to secondary infection by bacteria. Infection delays healing and often complicates the condition.

The best way to combat dermatosis is to prevent it from occurring. The most effective preventive measures include the following:

1. Safe handling precautions. Many materials are known to cause dermatoses. Repeated or prolonged skin contact with these should be avoided. Materials with unknown effects should be handled with caution.

2. Good safety practices. Conscientiousness on the part of the worker is an important preventative. The care he exercises may be the determining factor in whether or not dermatosis occurs.

3. Protective clothing. Many times substitutes are not available for dermatosis causing materials. Proper clothing such as gloves and aprons aid in preventing skin contact.

4. Good working conditions. Proper facilities, equipment, and tools, along with efforts to keep the working area free from dermatoses causing contaminants, can reduce the incidence of dermatoses.

5. Personal hygiene. Personal hygiene is the most important means of prevention. Good hygiene habits, such as frequent and conscientious washing and the use of effective cleaning agents, reduce the chances of developing dermatoses.

6. Early medical treatment. Medical treatment should be sought as soon as the first signs of dermatosis appear. Delay often results in progression of the condition, and once established it may become difficult to treat.

COMPATIBILITY: EXPLOSIVES WITH EXPLOSIVES VS EXPLOSIVES WITH MAN.

Robert F. Sill, Safety Inspector
Harvey Aluminum Sales, Inc.
Milan Army Ammunition Plant

At Milan Army Ammunition Plant one of our main concerns is the grouping of various chemical compounds into compatible groups within quantity limitations. A wide range of chemical compounds is essential to our mission, and compatibility is important to our safety program.

Those who have been in the ammunition business for any length of time know the importance of strict adherence to Section 19 of AMCR 385-224, the AMC Safety Manual. When we encounter new and sophisticated compounds, our first concern is compatibility. Full information is needed for safe handling from storage to processing.

If all explosives accidents involving storing or grouping of high explosives compounds were reviewed, it would most likely show that a very small percentage would have been caused by spontaneous action, acts of nature, or those of mysterious origin. Enough information on compatibility is available to permit the safe grouping and storage of explosives.

What accounts for the majority of the explosives accidents? The obvious answer is explosives compatibility with MAN!

Can we conclude that man is the triggering action in most accidents? Certainly we can! Maybe we have a "compatibility gap". In the interest of self-preservation and protection of public property, how can we close the "gap"?

Since each of us has a desire for self-preservation, why do we permit careless handling of ammunition? We know that careless handling of ammunition is inviting disaster, incorporated mechanical and chemical safety features notwithstanding. It is quite unlikely that a round of ammunition will function without application of an external force. Who generally supplies this force? Man, of course! It follows that a logical approach is to insure that each person handling a complete round of service ammunition knows its basic characteristics. He should be kept continually aware that the basic purpose of a service round of ammunition is to inflict damage on a target.

There are four tools within our reach that, if used, will take substantial contributions toward closing the gap.

1. There can be no end to training. Familiarization with an item should increase as exposure time to the item increases. Each person is entitled to know about his job, the mandatory procedures for performing it safely and why these procedures are mandatory. Each person engaged directly in ammunition processing has a responsibility to correct or report unsafe conditions and unsafe acts within his area of responsibility.

2. An open mind should welcome all suggestions and improvements offered, regardless of source. Abolish the thought that things are perfect as they now stand, even it we have been doing it this way for 25 years.

3. Supervisory personnel must set the example for explosive handling practices. Employees will do what their boss does.

4. Good housekeeping is of a paramount importance. A clean work area will instill pride in the worker and help him produce a better product in a safer manner. A clean area means many potentials for

accidents have been removed.

By adopting these four suggestions, we may not eliminate the gap, but we can narrow it considerably. As the gap is closed, man becomes more compatible with explosives.

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SHIELDING PASSES TWO TESTS

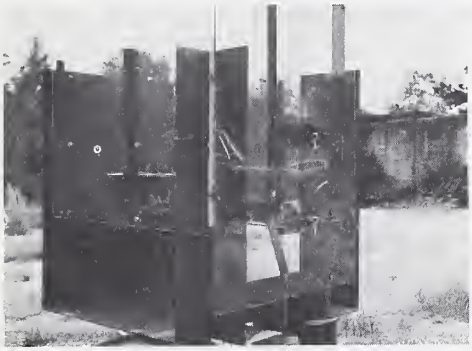
Joe McDonald, Safety Engineer
Thiokol Chemical Corporation
Longhorn Army Ammunition Plant

The old adage that the "proof of the pudding is in the eating" might also be applied to protective shielding. Although shielding is tested prior to installation on an operating line, it is how the shielding withstands an incident that really counts. The shielding used for a Longhorn Army Ammunition Plant operation passed both before installation and an operating incident test.

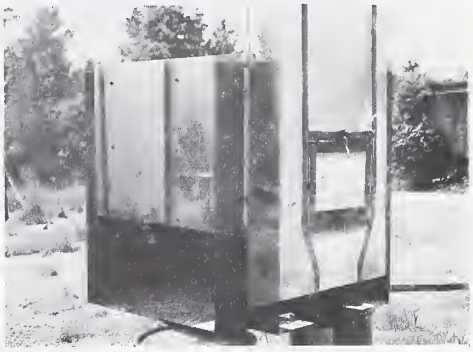
The composition used in the XM40E5 Anti-Intrusion Warning Mine is composed of two slurries that are combined, mixed and dispensed from 32 stationery mixing tubes. The explosives weight of the dispensing tubes, plus 25 per cent, resulted in a total test weight of 453.2 grams of composition. This quantity of composition was divided into four polyethylene bottles of 113.3 grams each. They were suspended between the upper and lower plates of the mockup. Photograph 1 shows the test setup prior to the simultaneous ignition of the bottles of composition. Photograph 2 shows the results of the test. The one-fourth-inch polycarbonate shielding material remained intact.

During the operation of the XM40E5 manufacturing line, a malfunction of the dispensing equipment caused an excessive amount of composition to be dispensed into the catch pan. In the process of lowering the catch pan for cleaning, some spilled

material that had become dry was initiated. Fire from it spread to the pan and the mix tubes. A number of small explosions were attributed to the material in the mix tubes. Photograph 3 reveals that although the shielding was blackened, it was still intact after being subjected to the fire and explosions. The three operating people in the immediate vicinity at the time of the incident were not injured.



Shown above is a test mockup of a shield used during an XM40E5 Anti-Intrusion Warning Mine manufacturing operation. The four bottles partly visible at the left center contained a total test weight of 453.2 grams of explosives slurry mixture.



The contents of the four bottles of explosives slurry were ignited simultaneously. As shown above the one-fourth-inch polycarbonate shielding material remained intact.

The shield at right is shown in place after an accident on a manufacturing line. While a catch pan was being lowered for cleaning, some dry spilled material was initiated. The fire spread to the pan and mixture tubes, and several small explosions followed. Though blackened, the shielding remained intact and protected nearby workers.

CONTAMINATED PIPE LESSON RETAUGHT

At an Army propellant manufacturing plant a 6-inch stainless steel pipe was used to transport a high grade nitrocellulose slurry from a boiling tub building to a pulping house building. A 45-foot section of the pipe was found to be unserviceable and was replaced. The old pipe was left lying on the ground outside one of the buildings.

Plant safety personnel became aware of the fact that the section of pipe had been discarded. They brought the situation to the attention of maintenance personnel. It was made clear that the pipe, though unmarked, should be decontaminated and removed from the area.

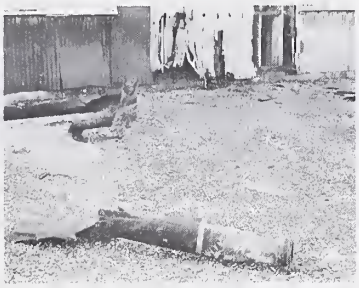
The information was received by a maintenance foreman soon after the start of a work shift. He called three of his workers and began to tell them of the job. He was interrupted before they could complete discussion of the contaminated pipe removal problem. There was a need for emergency repairs at another location. The foreman put aside the pipe removal job and sent two of his workers to perform the more urgent repairs.

The third worker, a maintenance mechanic welder, left unassigned for the moment, decided to proceed on the pipe removal job. He took a hacksaw and went to the place where the pipe had been left. He stated later that upon arrival he made a visual inspection and determined that it was safe to work on the pipe.

The mechanic began to saw off the pipe about eight feet from an end flange. When he had sawed part of the way through the pipe an explosion occurred. The man was blown backward about 20 feet. He landed in a sitting position, uninjured except for superficial cuts on his face and possible damage to his left eardrum. He required first aid treatment only.

One 4" X 4" piece of the pipe was blown 400 feet

from the explosion site. The explosion blew off the eight feet of pipe the worker had started to saw off and ruptured it all the way back to the flange. (See Photo 1.) About 10 feet of the longer pipe section was split and curled. (See Photo 2.)



No other personnel were injured. Property damage was limited to five windows on the first floor of the nearby building, some broken window panes on the second floor, and a few damaged or destroyed metal building panels. (See Photo 1.)

Investigation revealed that the foreman was not aware, until after the explosion occurred, that the mechanic had gone to work on the pipe. He made it clear that the work was done without instructions having been given. His discussion of the pipe removal job had not proceeded to a decision on the procedure to be used.

The welder agreed that he had not been instructed to cut the pipe, but had taken it upon himself to saw it into lengths that could be handled easily. He said he had been instructed in and was familiar with the plant's decontamination procedure. He had looked at the pipe from both ends and made his own determination that it was free from explosive contamination.

It was found that the pipe hade been replaced almost four weeks before the explosion. The failure of supervision to follow the plant decontamination procedure promptly when the pipe was removed was identified as one accident cause. Another was the action of the welder in sawing into the explosives contaminated pipe.

Safety meetings were held with all maintenance employees. Emphasis was given to performing work only on instruction and to the importance of following the plant decontamination procedure.

The explosion was brought to the attention of all the plant's employees. It was made clear to them that all equipment that had been used in or exposed to explosives should be considered to be explosives contaminated until properly treated as required by the plant decontamination procedure. (Editor's note: Also see Abstract Report No. ES 37, 30 June 1969.)

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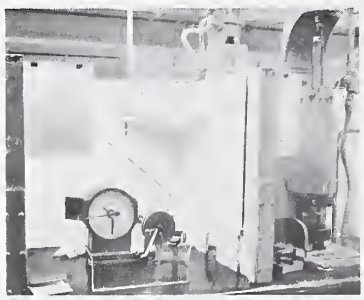
REMOTE SCOOPING SENSITIVE INITIATING EXPLOSIVES

C. Ruskewicz and Frank Davitt
Picatinny Arsenal

A manually operated device designed by the Picatinny Arsenal Machine and Tool Design Division is used for scooping sensitive initiating explosives such as Lead Azide RD 1333 and Primer Mix NOL 130. The purpose of this device is to protect the operator's hand in the event of an accidental detonation. It is designed to be operated remotely behind a plexiglass shield.



The device consists principally of a scooping rod operating through a ball joint mounted in a plexiglass shield. (The shield was tested to assure that it would contain an explosion of 3/4 ounce of lead azide.) The booth in which the device operates is approximately 30" X 30" and mounts on top of a table. It functions as a station in a hand loading detonator line. The rod has a calibrated scoop attached to one end and a control knob on the other. The device is shown in the center of Photo 1.

A one-ounce receptacle containing three-fourths ounce of explosives,conveniently mounted for scooping, is located in the booth. The operator, behind the shield, grips the control knob, operates the scooping rod and dispenses explosives powder from the receptacle to a portable fixture containing a detonator cup or primer cup.

The ball joint has a movement that is flexible enough to permit universal motion. The normal manual scooping action can be simulated. Generally the right hand operates the scooping rod while the left hand releases the interrupter lever. The purpose of the interrupter is to occupy the left hand so it must be removed from within the booth during the actual scooping operation. Photo 2 shows the device being operated.

This type ball joint and rod mechanism had previously been used with a test apparatus for detonator sensitivity testing (firing). In the event a "hang fire" (firing pin penetrating detonator but not initiating it) the firing pin is removed from the detonator for safety reasons with this type of device. The detonator is clamped in a fixed position behind a shield. One end of the rod has a tapered slot that by a wedging action, grasps the firing pin. When actuated, it then extracts the pin.

The design and development of this remote scooping device was initiated by Christian McVey and Frank Davitt of Industrial Services Directorate, Picatinny Arsenal.

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AUTOMATED PROPELLANT FILLING

Marlin A. Ressler, Safety Officer
Picatinny Arsenel

During the early part of 1968, an engineering study was initiated to find a more satisfactory way for

loading propellant into the 40mm cartridge cases and a means to generally improve the system. During the course of this study, it was determined that a portion of the loading line could be modified if an automatic propellant filler were installed.

The final equipment was chosen for several reasons, including initial cost and maintenance costs.

This fully automatic high speed propellant filler, shown in Photo 1, is designed to fill containers with propellant. Using a patented principle, material is drawn from the propellant hopper into the filling port of a filling wheel. The wheel indexes and deposits the fill through an oscillating funnel into a container positioned under the filling wheel.

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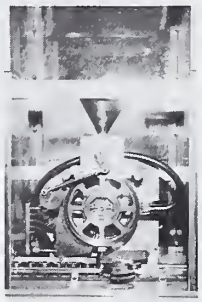


This precision equipment is operated by electric power and supplied with nonlubricated dry air at a pressure of not less than 80 or more than 90 pounds per square inch, at not less than three cubic feet per minute.

A vacuum inlet mounted on the machine provides vacuum for the "no dose" safety switch which prevents the discharge of propellant when there is no cartridge case in the fill position. The vacuum source provides at least 20 inches of Mercury with a capacity of not less than 12 cubic feet per minute. A 2 HP water-seal vacuum pump is used for this purpose to prevent a possible explosion hazard from propellant entering the pump. The water-seal pump requires a 1.4 gallon/minute maximum service liquid supply.

A transducer is mounted on the machine to provide a means of dust collection. The air supply is connected to the hose connection on the transducer. The hose leading from the dust collector shoe mounted on the head of the machine leads to the transducer. Any propellant particles picked up by the dust collection system will be deposited

2

in the dust collection jar mounted next to the transducer. (See Photos 1 and 2.)

The equipment can be leveled so tht the input and the output side of the machine is aligned with the infeed supply conveyor or unscrambler. The height is also adjustable by means of hexagonal jacks at the bottom of the legs of the machine.

This particular machine has been tooled to fill the 40mm grenade launcher cartridge case. The only adjustment to be made is the setting of the conveyor guide rails and upper guide bar.

The removal and reassembly of the hopper is not complex. Likewise, the removal and replacing of different filling wheels is relatively simple. The filling wheel can have either straight sided or tapered ports. The volume of fill obtained is determined by the diameter of the port in the filling wheel. Filling wheels range from one-eighth-inch to three-eighths-inch I.D. ports.

Each filling wheel is equipped with one or more sets of pistons. Each piston is adjustable for a range of fill depth of more than one-half inch. When the proper piston settings have been attained, the machine will continue to produce accurate fills without further adjustment. This will be true as long as the density of the product remains constant. Therefore, it is desirable that a new set of weighings be made to check the fill when the product placed in the hopper is from another batch than that with which it was first filled.

After completion of a production run, the actual fill depths used are entered into a log specifying the product filled and the weight obtained. Future reference to this log will greatly expedite the setting up of the equipment for a repeat run.

A number of safety controls are featured on this machine in that the feed wheels are driven through a spring-loaded ball-type clutch. This prevents damage to the feed wheels in the event a cartridge

case should come misaligned to the dosing position. The misaligned cartridge case is simply removed, the feed wheels are turned until a definite snap can be felt which indicates that the feed wheels are again synchronized to the filling wheel.

To prevent propellant from being discharged without a cartridge case present in position, a microswitch is mounted in front of the feed wheels. Unless the cartridge case makes contact with this switch, the fill of propellant will be retained in the filling wheel.

This machine is also equipped with a dose switch. With this switch in the "off" position, the machine can be operated without propellant discharge.

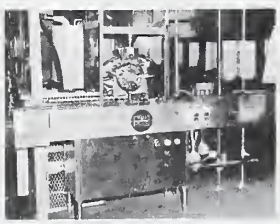
All switches on the face of the electrical panel are industrial type, heavy duty material. An indicating fuse holder on the face of the panel will indicate a circuit overload (light will glow).

The main motor is operated through a magnetic starter with overload protection.

Maintenance is performed daily by cleaning the machine thoroughly and lubricating accordingly.

Electrical difficulties can be corrected easily by using the wiring diagram.

Mechanical difficulties can be most readily corrected by referring to the assembly drawings and by careful examination of the equipment at the point of difficulty.



The photo at right shows the automatic high speed propellant filler as it appears on the loading line. The upper portion of the dust collection jar is to the left behind the filler.

Complete removal of the conveyor belt can be accomplished by locating the removal link in the chain belt. Open the link and remove the belt

which is now opened up from a complete loop.

Maintenance of piston filters fall into two divisions:

1. Felt filters can be either changed or cleaned. As they are relatively inexpensive, it is good practice to change them frequently.

2. Sintered or wire filters can be cleaned by immersion of the element in a tank through which prefiltered water is flowing. These are rinsed for a period of two to four hours and then dried and returned to service.

After a period of operation it was obvious that this equipment has many advantages over the hand line. Maintenance problems have been minimal and simplified. From a safety standpoint, the equipment requires a minimum of personnel to operate, thus reducing exposure. Visual inspection prior to performing maintenance work on or around the equipment gives positive assurance that the equipment is free and clear of propellant and that the hopper, filler wheel, and collector are empty and safe for maintenance work.

Additionally, the loader is adequately shielded on all sides to protect personnel, and the dust collection jar mounted next to the transducer is shielded in event it should rupture.

SAFE ASPECTS OF CLOTHING IN THE WORKING ENVIRONMENT

Does clothing play a role in accident prevention in the ordinary plant situation? There is no argument that protective clothing is required for certain work situations but the question often arises if certain types of clothing should be required for general factory workers. The purpose of this item is to survey the role that clothing can play in the working environment with respect to accident prevention.

Generally, clothing can affect safety in three ways: Suitable clothing can protect the worker from a hazard. Unsuitable clothing can add to the hazard. Unusual or indiscreet clothing can create a distraction.

Tough as it is, the skin can be burned by hot metals, liquids, and gases; by radiant heat from processes, fires, and the sun; and by chemical agents. In addition, the skin can be cut, torn, abraded, and scratched by bumping into piles of stock, by being struck with flying objects, or by contact with machinery. Finally it can be irritated by contact with many materiels.

Special protective clothing is worn wherever the hazard is sufficient to require special action. But the wearing of suitable clothing will provide a fair degree of protection in many cases where the hazard is not sufficient for special clothing.

Thus for men, sturdy pants are preferable to Bermuda shorts where there is the possibility of scratching the legs. This is no excuse for poor housekeeping; they are an added protection. Small spills will also be caught by pants, giving a small degree of protection which can make a difference.

In hot weather, there is the temptation for men to remove shirts. This practice exposes a large area of skin to irritants and scratches. In the event of a small flash fire, the area of burns may be increased considerably. One fatality was believed to have been caused by not wearing a shirt, thereby permitting a combustion chamber flash to burn the upper body. Shirts also prevent dust and mists from reaching the skin and if substantial enough will stop the rays from electric welding.

For women, neat fitting coveralls will provide a similar degree of protection. Skirts and light blouses permit the same injuries as mentioned for men. Not only do shorts create more exposure but, as will be discussed later, they may be a distraction.

For both men and women, open-toed shoes or sandals provide no protection. If no foot hazards exist, sturdy well-built shoes are suitable. However, experience in industry has proved the value of steel-toed safety shoes in all plant situations.

HAZARD ASPECTS OF UNSUITABLE CLOTHING...

Clothing generally tends to introduce a hazard in one of two areas, entanglement and fire. Zippered clothing, particularly coveralls, may be difficult to shed in an emergency, if the zipper should get stuck. Loose clothing, or clothing with cuffs or loops which are easily caught is a hazard around moving machinery, especially turning shafts. Any study of injury experience soon reveals illustrations of this. Some firms are issuing shorter length smocks because the longer, knee length tended to billow out and get tangled in machinery.

With respect to fire, clothing can either be a source of ignition hazard, for example, the increased static electricity hazard from some synthetics, or it can be a fire hazard in itself, examples being brushed rayon, loose cotton, and oil-soaked clothing.

UNUSUAL OR INDISCREET CLOTHING

During World War II, a sign in a machine shop read: "Girls. If you wear loose sweaters, watch out for the machines. If you wear tight sweaters, watch out for the machinists". Distraction is a well-known basic accident cause and either unusual or indiscreet clothing is a proven form of distraction.

Although this may be a delicate subject, it is a factor which must be considered when a sun-loving, comfort-hunting lass shows up in short shorts or a young blade appears with his gaudy sport shirt and Bermuda shorts.

SPECIAL CONSIDERATIONS IN SOME WORKING ENVIRONMENTS:

Revolving Machinery

Whenever revolving machinery such as drills, lathes, circular saws, roller mills, etc., is operated, neckties, gloves, rings, and loose baggy clothing should not be worn. Close fitting coveralls with short sleeves are recommended when operating this type of equipment. In the case of female operators, (or long haired youths) the hair should be protected by means of a suitable cap.

Flammable Liquids

Where flammable liquids are used, synthetic clothing which may produce a static spark should not be worn. Under some conditions, for example in a hospital operating room, all clothing including undergarments should be made of cotton, and combs should not be worn in the hair.

Acids and Alkalies

Wool clothing provides good protection from acid burns, whereas when handling alkalies cotton clothing is better. This applies to work where the acids or alkalies are fairly dilute solutions.

Dusts

In dusty atmospheres close fitting, finely woven, smooth surface cotton garments with long sleeves and snugly fitting collars provide the best protection. In the case of flammable or explosive dusts, the wearing of silk, acetate silk, and other synthetic garments should be avoided.

Radiant Heat

For protection against radiant heat where the temperature is not too extreme, the wearing of light weight, loose fitting, porous clothing provides sufficient protection.

Infra-red and Ultraviolet Radiation

Garments made of wool or leather will provide protection from infra-red and ultraviolet radiation.

Sparks

In welding and grinding operations, hot metal sparks are a serious hazard. Wool undergarments with clean cotton outer clothing free from grease and oil are recommended. The outer garment should have long sleeves, snug fitting collar and the pants should not have a turned up cuff. There should also be no pockets where the sparks could lodge.

Last year there was a fatal accident when a welder was wearing oily, greasy coveralls with a turned up cuff on the pant legs. A spark lodged in one of the cuffs causing the clothing to catch on fire. He was so severely burned that death occurred a few days later.

Hot Metal

Garments made of leather or wool provide some protection from hot metal splashes.

Where ordinary clothing does not provide sufficient protection and hazards exist after all practical engineering control measures have been taken, then the workers should be further protected by the use of specially designed personal protective clothing. This personal protective clothing should not be used as a substitute for the elimination of unsafe acts or conditions but should be used as a supplementary safety measure when required.

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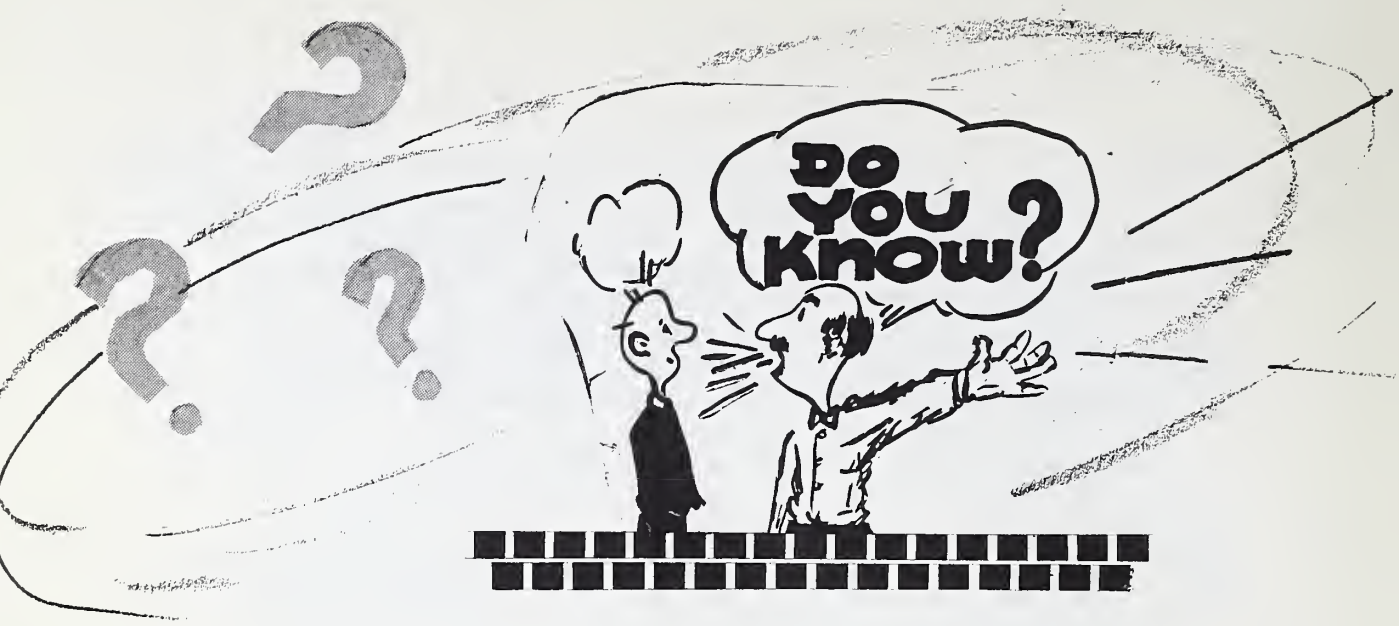

■ Here are ten questions that will test your knowledge of Army aviation safety requirements. The answers to all of them may be found in AR 95-1, Army Aviation - General Provisions. The correct answers and references appear on pages 54 and 55.

1. Under what three conditions may an Army aviator without an instrument card (3-3) clear his own flight?

   Answer and reference:

2. Boundaries of the local flying area will be within how many nautical miles of the base airport?

   Answer and reference:

3. May an aircraft be flown under instrument flight conditions if the pitot heater is inoperative?

   Answer and reference:

4. Into what type of icing conditions may an Army aircraft be flown if it is equipped with an adequate deicing and/or anti-icing equipment?

   Answer and reference:

5. What common household item is required equipment for VFR night flight?

   Answer and reference:

6. How much ground time may be spent at an intermediate stopover point, during a VFR or IFR flight before it becomes necessary to file a new flight plan?

   Answer and reference:

7. What are four occasions when helmets, APH-5, will be worn when available?

   Answer and reference:

8. Can you list six conditions under which smoking in an aircraft is prohibited?

   Answer and reference:

9. What is the maximum altitude above which an Army aircraft will not be flown without the use of oxygen by members of its crew?

   Answer and reference:

10. Under what circumstances may the anticollision (Grimes Light) lighting device be turned off during flight?

    Answer and reference:

WHO WAS HURT IN THE ACCIDENT?

Questions are asked after every accident. Who was hurt? How badly? Was there much damage?

Stripped of detail, the answers are likely to be as brief as these: "Joe Smith was injured, and he is receiving intensive care at the City Hospital. His machine will be out of production for a week."

Such answers are as superficial as they are terse. They barely begin to answer the questions about who has been injured and how severely.

Just who was hurt by Joe Smith's accident?

1. Joe was obviously injured. It was his flesh that was torn, his bones fractured and his blood shed. He is in pain now, and he is certain to suffer continuing pain and discomfort until his recovery is completed. Even then there may be physical and economic aftereffects.

2. Joe's family has been injured in several ways. They are distressed and alarmed by his shattering experience and his physical condition. They have suffered an unpleasant emotional shock. They can expect to spend time and energy visiting him at the hospital and caring for him during his convalescence. Joe's medical benefits, no matter how generous they may be, may not pay all his expenses. It is entirely possible that the aftereffects of his injuries may reduce his future earning power.

3. Joe's employer has been injured. Joe must be compensated for his injury, by sick leave, employee compensation or insurance benefits, as appropriate. All of these are costly, with no return received by the organization. Another worker, perhaps not as efficient as Joe, must do his work until he returns. Damaged property must be repaired or replaced.

4. Joe's supervisor has been hurt. The job has to go on and he was depending on Joe to do a share of it. Now it may be more difficult to meet the schedule, with a substitute filling Joe's place. There is also the extra work of explaining how the accident happened,

preparing a report on it, and telling why it was permitted to occur. There may be no satisfactory answers to questions that may be asked. Joe's experience makes his supervisor look bad.

5. The plant management is hurt. Headquarters may demand explanations about Joe's accident. Why wasn't the accident prevented? The reflection on the installation is unfavorable. There are costly investigations and reports. Process and equipment safety changes, at considerable expense, may be required.

6. The customers of Joe's plant are hurt. As a result of his being injured the delivery schedule may not be met. The product received may be poorer, because of the loss of his expert workmanship.

7. The contractor for whom Joe works is hurt. "They don't know what they are doing" comments are heard. "Some company that knows its business should be hired to do this job." The fine safety record of the past is forgotten, and the one bad accident is emphasized.

8. The owners of the plant or company are hurt. (If it is an Army installation, the owners are commonly called "taxpayers".) The lost from Joe's accident comes home in part to every one of them. The monetary costs of his injury, the decreased efficiency that followed from it, and the less efficient worker Joe may be in the future are all a burden on them.

■ Joe's injury is everybody's injury to some degree. No matter how you look at it the smart and humane thing is to exert the extra effort, before he has an accident to keep him safe, whole and on the job.

WELL, DID YOU KNOW?

Here are the answers to the questions on pages 50 and 51. All questions were based on information contained in AR 95-1 and its current changes. A reference to the pertinent paragraph follows each answer.

1. An Army aviator without an instrument card (3-3) may clear his own flight under the following conditions:

   a. The flight is within the local flying area.

   b. The flight is from an area that does not have a military base operations office with clearance authority.

   c. A change of flight plan is required en route, and the ceiling and visibility en route and at the final destination is reported to be VFR and forecast to remain so until ETA plus 1 hour.

   Reference: Paragraph 24e, AR 95-1, Change 7.

2. Boundaries of the local flying area will be within 100 nautical miles of the base airport. Reference: Paragraph 14a(1), AR 95-1.

3. No. A pitot heater and all vacuum or electrical sources for an Army aircraft must be operative before it is permitted to be flown under instrument flight conditions. Reference: Paragraph 21a, AR 95-1.

4. If properly equipped with adequate de-icing and/or anti-icing equipment, the aircraft may be flown through known or forecast light or moderate icing conditions. No aircraft will be flown into known or heavy icing conditions. Reference: Paragraph 21d, AR 95-1.

5. A dependable flashlight must be available to the pilot in flight. Reference: Paragraph 22b, AR 95-1.

6. Ground time at an intermediate stop will not exceed one hour, excluding clearance delay. Reference: Paragraph 26e, AR 95-1.

7. Helmets APH-5, when available, will be worn under the following circumstances:

    a. During combat.

    b. During tactical training.

    c. During test flights or similar flights that involve unusual hazards.

    d. At other times as prescribed by unit commanders.

    Reference: Paragraph 28c, AR 95-1.

8. Smoking in an Army aircraft is prohibited under the following conditions.

    a. During all ground operations.

    b. During and immediately after takeoff.

    c. During fuel transfer operations.

    d. Immediately before and during landings.

    e. At any time occupants detect gas fumes.

    f. When oxygen is being used.

    Reference: Paragraph 29a, AR 95-1.

9. In no case will an Army aircraft be flown above 14,000 feet without oxygen being used by its crew. Reference: Paragraph 29b, AR 95-1.

10. When an aircraft is being flown IFC in the clouds, the Grimes Light may be turned off, because of the possibility of vertigo being induced by the light. Reference: Paragraph 29c(3), AR 95-1.

KEEP THE GREEN LIGHT BURNING

Safety Office
Louisiana Army Ammunition Plant

"Keep the Green Light Burning", is a familiar safety slogan at the Louisiana Army Ammunition Plant. It originated with the installation of a set of one green and four red lights on tops of three jumbo safety poster boards near major plant entrances. Lights are also mounted on the main building of the Metal Parts Manufacturing Plant. The lights alert personnel when a disabling injury occurs and tell them the number that have occurred during the current reporting period. On the 21st of the month the green light is turned on and it continues to burn until a disabling injury occurs. Then the green light is extinguished and a red light is turned on. If more disabling injuries occur, additional red lights are illuminated. By glancing at the billboards, employees know how the plant stands as far as disabling injuries are concerned.

The continuing Louisiana Army Ammunition Plant goal is to have zero disabling injuries. All its employees know the meaning of the motto, "Keep the Green Light Burning".

UNITED STATES ARMY MATERIEL COMMAND

WASHINGTON, D.C. 20315